

**REMARKS / ARGUMENTS**

Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Claussen (USPN 3,418,446) and claim 1 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Kato et al. (USPN 6,649,872). Applicants are amending claims 1 and 2.

The Examiner rejected claims 1 and 2 as being unpatentable over U.S. Patent No. 3,418,446 to Claussen (hereafter *Claussen*) on the grounds that *Claussen* does not teach the equation (1) in the present invention, but the properties of the electrodes are same and the ratios of tensile strength are similar with each other. In addition, the Examiner contends that if a composition is physically the same, it must have the same properties since the chemical composition and its properties are inseparable.

However, *Claussen* discloses methods of controlling the compositions of steel sheath and flux to be filled in order to obtain the improved weld metal and controlling the filling ratio in order to prevent the sheath's collapse during drawing and unproportional flux' spread. More specifically, *Claussen* discloses flux cored wires comprising a steel sheath constituting at least 72~75 % by weight of the electrode and a flux constituting optimum contents of 16 % by weight of the electrode, wherein the flux consisting of the following several ingredients: 1) rutile 55.0%, manganese 16.0%, ferrosilicon 14%, magnetite 15.0% by weight of the core material(flux), 2) rutile 55.5%, manganese 22.5%, ferrosilicon 7%, magnetite 7.5%, silica sand 7.5%, which is added to increase the viscosity of the weld metal, etc. It is stated that in accordance with the following conditions, the objects of the invention can be accomplished and concurrently the mechanical properties, for example, the tensile strength of the weld metal are 78,000 and 81,000, respectively.

As described above, unlike the present invention, *Claussen* discloses a wire filled fully with a flux having specific compositions, and an improved weld metal according to the composition and the particle size of flux. As can be seen from the experimental results showing the different tensile strength depending on whether the silica sand of the core materials is added or not, the mechanical properties of the weld metal vary with the composition of flux filled. Therefore, *Claussen* is completely different from the present invention that can improve rectilinear propagation without the occurrence of bead meandering during welding by means of

managing the ratio of real tensile strength of flux cored wire to that of the wire in the state of metal pipe with flux un-filled within the specific range.

While the real tensile strength of present invention is that of the wire with flux filled and with flux un-filled irrespectively of the composition, the tensile strength of *Claussen* is that varies with the various chemical compositions of the flux filled fully. Therefore, they are different from each other in relation to the object and meaning.

With regard to the properties of wire electrode, the present invention and *Claussen* are only similar with flux cored wire and the common manufacturing procedure (forming a steel sheath – filling a flux – forming the sheath into a O shape – drawing), but not same with the wire properties, i.e. mechanical and chemical properties.

The Examiner rejected claim 1 as being unpatentable over U.S. Patent No. 6,649,872 to *Kato* et al. (hereafter *Kato*) on the grounds that *Kato* does not teach the equation (1) in the present invention, but the properties of the electrodes are same and the ratios of tensile strength are similar with each other. In addition, the Examiner contends that if a composition is physically the same, it must have the same properties since the chemical composition and its properties are inseparable.

However, *Kato* discloses methods of controlling the compositions of wire and flux to be filled in order to promote the release of globules, decrease the sizes of globules and increase the number of transfers of globules. More specifically, [Table 4] and [Table 10] of *Kato* show that the mechanical properties (including tensile strength) of the wire and arc conditions vary with whether butt is present or not, whether plating is present or not, the difference of the flux filling percentage (there was not any wire flux unfilled), and the chemical composition.

It is stated that in accordance with the following conditions, the objects of the invention can be accomplished and concurrently the mechanical properties, for example, the tensile strength of the weld metal are 78,000 and 81,000, respectively.

With regard to above, the present invention is completely different from *Kato* in which the mechanical properties of wire electrode vary with the variable chemical compositions.

With regard to the properties of wire electrode, the present invention and *Kato* are only similar with flux cored wire and the common manufacturing procedure (forming a steel sheath – filling a flux – forming the sheath into a O shape – drawing), but not same with the wire properties, i.e. mechanical and chemical properties.

Particularly, with regard to the wires (W1, W3) mentioned by the examiner having the ratio of tensile strength 582/524, it is stated in *Kato* that the wires has no butt of steel sheath and are the flux core wires having certain flux filling percentage. This is completely different from the present invention of which wire has butt and in which the ratio of the real tensile strengths in the state of flux-filled wire and in the state of flux-un-filled wire is provided.

As described above, unlike the present invention, *Kato* discloses a wire filled fully with a flux and having specific compositions, and an improved welding workability according to the compositions.

While the real tensile strength of present invention is that of the wire with flux filled and with flux un-filled irrespectively of the composition, the tensile strength of *Claussen* is that varies with the various chemical compositions of the flux filled fully. Therefore, they are different from each other in relation to the object and meaning.

With regard to the properties of wire electrode, the present invention and *Kato* are only similar with flux cored wire and the common manufacturing procedure (forming a steel sheath – filling a flux – forming the sheath into a O shape – drawing), but not same with the wire properties, i.e. mechanical and chemical properties.

### **Conclusion**

As described above, the present invention is different from *Claussen* and *Kato* in terms of purpose and means to achieve the purpose. Also, since the deviation in the real tensile strength according to whether the flux is filled or not could not have been easily conceived of by one of ordinary skill in the art to which the invention pertains based on *Claussen* and *Kato*, the present invention has inventiveness compared with *Claussen* and *Kato*. Therefore, we respectfully request that the Examiner withdraw the rejections and issue a decision to grant a patent unless other rejections for refusal are found.

The Commissioner is hereby authorized to charge any additional required fees from Deposit Account No. 502811, Deposit Account Name THELEN REID BROWN RAYSMAN & STEINER LLP.

Should the Examiner have any questions concerning the foregoing, the Examiner is invited to telephone the undersigned attorney.

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Respectfully submitted,

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